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FinTech – What's in a Name?

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FinTech – What's in a Name?

Completed Research Paper

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Abstract

FinTech, the word which originates from marriage of “finance” and “technology”, designates currently a novel, innovative and emerging field which attracts attention from the publicity. At the moment there is no universal understanding and definition of FinTech in the research, however, the topic is widely addressed by the English- and German-speaking press. In this study we aim to make insights into how the press and other popular media understand and frame FinTech, discussing definitions that represents the meaning of it for the press, and deliver the conceptual framework to be used in research and scientific literature. In doing so, we also identify drivers of FinTech and put them in the context of financial and digital innovation research. Thereby, we provide objective understanding of FinTech, how it is reflected in the popular media.

Keywords: FinTech, innovation, digitalization, content analysis, popular press

Introduction

The world of finance, in particular banking sector, has proven to be of outstanding importance in daily lives of people around the globe. Classical banking has been changing significantly through the last century, but today we're facing the birth of new epoch of financial services, bearing the name “FinTech”, which is hardly explored and, therefore, may be seen as challenging environment.

There is no doubt that traditional financial technologies have been undergoing a huge change throughout the last decade. Therefore, people often start talking about new type of financial technologies – FinTech. FinTech is currently an innovative and emerging field, which attracts attention from the publicity as well as up-growing investments. According to Accenture report (Skan et al. 2015) the number of investments into FinTech companies and start-ups has risen dramatically only within one year, from USD 4.05 billion in 2013 to USD 12.2 billion in 2014. These figures demonstrate that the sector is becoming of the high interest in the world of finance and, therefore, provide fruitful soil for further ingenious ideas and research. Furthermore, FinTech brings new opportunities to give power to people, for example, by allowing transparency, reducing costs or cutting middlemen and – what is even more important – to make information accessible. FinTech also affects banks which are cautious of being disrupted and, therefore, try to catch on the “FinTech”-train, observing all these thousands of startups which create alternatives to traditional banking services.

Even though the term “FinTech” is in the limelight of hot public debate in fields of business, finance and innovations, its meaning still remains ambiguous for most of the people. This vagueness refers both to experts, who deal with FinTech in their working practices or create and shape the field by themselves, and to those, who are looking at it from outside, being mainly targeted customers or only observers. One reason for this could be novelty and rapid tremendous rise of FinTech industry. FinTech is a very broad phenomenon and it's changing with each passing day because more and more technology entrepreneurs step into the industry, transforming it and adjusting to social needs. On the one hand, FinTech could be understood as a financial service, which is intervened by innovative technologies in order to satisfy the major requirements of “tomorrow”: high efficiency, cost reduction, business processes improvement, rapidity, flexibility, innovation (Dapp et al. 2014). On the other hand, the term “FinTech” is also used to refer to companies – and, what is even more common, to start-ups – which serve as enablers of such kinds of services. At this point the term “FinTech” is ambiguous and leaves space for further discussion. We argue that shedding light on the term and its understanding will help both practitioners to identify potentials and threats of the phenomenon, and researchers to unveil new possibilities for research regarding all aspects of FinTech (e.g., technologies behind, ecosystems, organizational matters, etc.).

The importance of financial industry in economic growth raises the importance of financial innovations, which can be seen as some new entity which is followed by reduction of risks, costs or provision of product/service/instrument that meet needs of involved parties better than before (Frame and White 2014). Having this considerable technological breakthrough within the scope of financial services in mind, we also find ourselves at the key point for reflecting on main topics being discussed around the buzzword “FinTech” from the perspective of the key media¹ and industrial sources, which are naturally involved in specific societal discourses and frame the notion of FinTech accordingly.

While there is a generous amount of research conducted in the field of financial services and banking sector, only a few scholars have touched upon FinTech industry. The context of research is very open today and unexplored new horizons are only being revealed at the moment as far as new FinTech companies spring up like mushrooms overnight and start reinventing the industry. This motivates us to take heed of it and to make one step forward and to look how FinTech actually harmonizes with and is engaged in the real world. Since the research on the phenomenon “FinTech” in the information systems research community is in its infancy and the topic is covered only by a few papers, we take an explorative and qualitative approach and base our analysis on the results of the review of scientific publications, professional reports, articles from newspapers and magazines. Yet media discourses on the aspects of information technologies have drawn little attention from IS researchers (Cukier et al. 2009). But we believe that the popular media is one of the important observers and reflectors of the general consensus of the public, but also plays a role of the social entity which influences it, and therefore is worth attention of the researchers. However, it is important to remember that such analysis remains a reflection of the reflection of the actual reality. The majority of the sources, analyzed in this study, were obtained through research databases and newspaper databases and geographically cover the North American continent and the English- and German-speaking countries in Europe.

Inspired by such a noticeable explosion of FinTech in the media, in our research we create an overview of locations, people, their motives and intensions, organizations and relationships as well as a central historical events which shape and underlie the phenomenon. Furthermore, we identify central discourses around FinTech and its role in the current environment. Therefore, we set the following research question:

How is FinTech perceived through the lens of the media and how has the perception of the phenomenon developed over time?

In order to address our research question and support our argumentation, we subdivide the research question and focus on three aspects, which will guide the reader through the paper, namely:

- (1) *How is FinTech perceived?*
- (2) *What are the primary actors that influence FinTech over time?*
- (3) *What topics are discussed in the press in the context of FinTech?*

This study makes four main contributions. First, the paper contributes to the IS research in a way that it introduces the phenomenon of FinTech by presenting common understanding through its perception in

¹ Here and further in the text by mentioning “the media” we mean popular press.

the popular media. For this purpose, we analyze a wide range of sources and based on this analysis we create a conceptual framework of FinTech, seen through the eyes of the press. This brings value to those scholars who are searching for the starting point and the basis of their research on FinTech. Second, this paper presents a methodological approach, which may be used for exploring the new field in IS and shedding the light on a general consensus on the phenomenon, obtained by the social actors (the press in case of this study). Third, the paper contributes to the literature on financial and digital innovation by putting FinTech in its context, identifying and analyzing the drivers which motivate FinTech. Fourth, the study also has practical implications in that, as a reflection of socially constructed phenomenon, it might become an interesting subject of discussion for entrepreneurs and investors, who already focus their activities on innovative financial services or consider the sector of FinTech as a possible direction.

The remainder of the paper is organized as follows. In *related work* we refer to the set of available scientific literature which will further on serve as a basis for the intensive discussion. To do that we give a glimpse of existing literature on FinTech, then we build our theoretical background identifying the meaning of financial and digital innovation, and then main drivers of financial innovation. Subsequently, we outline the research *methodology* of this study. *Results* section gives an overview of collected data, both quantitative and qualitative, and observations we made. Our results include three components: a conceptual framework of FinTech which reflects its perception in the press, the main actors involved in the development of the phenomenon (namely organizations, persons and locations) and the topics which arose in the context of FinTech in the studied period of time. Thereafter, we summarize our analysis and *discuss* research findings. Here we discuss how the proposed conceptual framework of FinTech differs from the existing understanding of financial and digital innovations, and also how the perception of FinTech fits into the media discourses observed in the studied sources. Furthermore, the drivers of FinTech are in the focus and here we discuss, how they motivate the phenomenon and create an ecosystem for FinTech innovations. In the end this leads us to the *conclusion and limitations* of the study, but also inspires with ideas for future research.

Related work

To our knowledge, researchers in the field of IS have just recently started to use the term in their studies, to define what exactly FinTech means and where its roots are. It's noteworthy to admit that when we attempted to collect a body of knowledge on FinTech, we performed a query in the web search engine of scholarly literature Google Scholar with keyword "fintech" but could not get any relevant articles or books which could meet our criteria². However, when we accessed the database two months later, we noticed that the hype around the topic has reached the research community and we managed to find three relevant studies³, all of them were freshly published in 2015. All of them do not directly focus on the FinTech phenomenon, but rather mention it briefly in relation to their specific research interests. For example, in their study Lee and Kim (2015) define the term "FinTech" as the background of their research and then analyze FinTech industry in Korea, primarily concentrating their exploratory study on crowdfunding case. Arner et al. (2015) describe the evolution of FinTech sector through three major eras and, then, mainly focus on the challenges which are faced by the area from the regulatory perspective. Lee and Teo (2015) define five principles of a business model which should help and contribute to the success story of a FinTech company. Looking at these few papers, we conclude that the topic in its state is hardly introduced to the research community, however attracts the growing interest from the scientists. For example, Journal of Management Information Systems (JMIS) has recently announced a call for papers for "Special Issue: Financial IS, Underlying Technologies, and the FinTech Revolution". Unsurprisingly, companies and enterprises from world of finance, consulting, business and technology keep an eye on the fast-growing activities of FinTech and publish professional reports where they intend to structure the field in order to identify challenges and obstacles and make the most of the opportunities that are being created. For instance, Skan et al. (2015) discuss future risks and opportunities for banks to be disrupted, while Cuesta et al. (2015) looks at FinTech in relation to digitalization and digital transformation of the financial services particularly in the banking sector and state that there are three existing successive phases of digitalization of bank's processes: reaction to the new competition, technological adaptation and strategic positioning. The report from the World Economic Forum (2015) shows that technology innovation is

² Accessed on 31.08.2015

³ Accessed on 31.12.2015

inevitable and its effect is going to be more considerable in the banking sector. Moreover, disruption is seen as a continuous process which leads to and motivates the industry to innovate according to customers' needs and behavior.

FinTech is acknowledged to be a new hype, which brings technologies in the financial industry to a new level enabling it to innovate and revolutionize the concepts of thinking about money and banking itself (Baur et al. 2015). However the word “hype” itself carries negative connotation in public, press and research by frequently being contrasted with such concepts as “hope”, “reality” or even “dawn of a new era” (e.g. Brown 2003; Puetting et al. 2003; Verfaillie et al. 2002), in our study we strive for neutrality while speaking about a hype. The connection between the popular press hyping a research phenomenon is confirmed by several studies in the fields of organizational management, biotechnology, medicine (Bubela and Caulfield 2004; Caulfield 2004; Mazza and Alvarez 2000; Ransohoff and Ransohoff 2001). However, the studies come to rather ambiguous conclusions. Even though the data suggests that popular press properly reflects findings published in scientific journals (Bubela and Caulfield 2004) and it is possible to avoid miscommunication between research and media publications (Ransohoff and Ransohoff 2001), the media takes different approach in comparison to academic studies in providing and highlighting information (Mazza and Alvarez 2000). Moreover, the influence of the popular media on theories and practices continuously increases, especially in Europe (Mazza and Alvarez 2000). We examine the phenomenon which is hardly researched by academia, but widely covered by the press, therefore, we cannot compare our analysis with the ones discussed before. We consider FinTech, being a hyped and similar in the way it emerged, phenomenon as E-Business in the early 2000s in the way how it became visible in the press and then diffused into research (Coltman et al. 2001). This encourages us to approach the discovery of the FinTech phenomenon from the perspective of the popular press and go beyond the hype, looking back at our research question and finding what FinTech actually means and what underlies its evolution.

FinTech is closely related to and linked with financial innovation. Frame and White (2014) provide the overview of how financial innovations had been changed within three categories – new products and services, new production processes, new organizational forms. Financial innovation can be also seen as “the act of creating and then popularizing new financial instruments, as well as new financial technologies, institutions, and markets” (Lerner and Tufano 2011). Scholars approached financial innovations from different perspectives: historical (Miller 1986), functional (Merton 1995), legal, organizational, etc. Furthermore, according to Cuesta et al. (2015), there is no doubt that FinTech goes along together with global digitalization, and, therefore, it is also important to define digital innovation, which we further refer to. Digital innovation is defined by Fichman et al. (2014) as “product, process, or business model that is perceived as new, requires some significant changes on the part of adopters, and is embodied in or enabled by IT”. Consequently, we aim at providing an understanding of FinTech as seen from the perspective of the popular media. This shall help identifying the links between the overall innovation discourse and the phenomenon of FinTech.

In our study, addressing the second and third parts of the research question, we are also interested in identifying the drivers which underlie and motivate the phenomenon of FinTech, therefore, the literature which highlights main forces that move financial innovation ahead is in the special focus. These drivers discussed below are not mutually exclusive and rather naturally overlap each other. Studies agree that *tax changes* and changes in *governmental regulations* are not the only ones impulses to innovations, which create new opportunities and potential for “successful” innovations (Frame and White 2004; Miller 1986; Tufano 2003). Financial innovations that are caused by taxes or regulations can be seen as both socially positive or negative phenomenon (Frame and White 2004). One more driver of financial innovation, suggested by the literature, is *underlying technologies* (e.g. telecommunications or data processing) which enable to conduct risk management more accurately and effectively (Frame and White 2004; Tufano 2003). Another factor which might foster financial innovations, according to Frame and White (2004), is *instable macroeconomic conditions*, which create much of uncertainty and risks, such as world economy crises. Furthermore, having summarized literature on financial innovation, Tufano (2003) derives other factors which stimulate financial innovation. These include *market incompleteness*, namely unfulfilled needs of market players; *agency issues* and *information asymmetries*, referring to conflict of interests between involved parties; *transaction, search or marketing costs*, meaning innovations which aim at costs reduction. These are main factors influencing and stimulating financial innovations, suggested by the literature. They are not listed and discussed in the order of their priority, weight or impact they have on

innovations, therefore, we do not assess them from this point of view. Here it is noteworthy to admit, that all of them refer not to the stable constructs but rather to dynamical and changing notions, what corresponds to the approach of our study – looking at FinTech changing along the time.

Methodology

Discourse analysis of novel concepts faces specific methodological challenges: The starting point for the analysis is often an underspecified buzzword rather than a well-designed concept. Consequently, the method shall enable for an exploratory and open ended approach towards the data. Since we take newspapers as the base of our inquiry, the applied method needs to acknowledge the not-neutral and not-objective features of the considered texts. There is a notable variety of methods to employ for a constructive approach towards such set of data ranging from *content analysis* to a family of *discourse analysis* methods including the critical or interpretative discourse analysis and radical humanism (Cukier et al. 2004; Wooffitt 2005). Those paradigms differ in their conceptualization of discourse. Due to the exploratory character of our research and based on the need to broadly characterize the phenomenon *FinTech*, we adhere to the interpretative paradigm: we assume the reality and discourse to be socially constructed and focus on examining the status quo rather than effecting change (Cukier et al. 2004). We enrich the analysis by employing tools typical for content analysis, such as identification of central entities and dominating topics in the texts. This allows for a better illustration of the identified trends and discourses.

Data collection

In order to provide a broad and well-grounded analyses on FinTech discourses, we identify a set of most influential opinion making newspapers from English and German-speaking regions of the Europe and North America. Overall, 46 different newspapers are chosen based on the 2015 Newspaper Web Ranking⁴ which uses web metrics extracted from the following services: Google Page Rank, Alexa Traffic Rank, and Majestic Seo Referring Domain. This ranking aims at providing popularity of particular newspapers and their webpages – it represents the impact of a newspaper not only in the real but also in the virtual world, which was an important criterion given the strong relationship between our phenomena of interest and the modern ICT. Our selection of newspapers and magazines includes: 11 in Germany, 9 in USA, 5 in UK, 3 from Switzerland, 1 from Austria, 2 from Canada, and 15 which clearly address international audience. In order to identify relevant articles, we conduct a keyword search in the Factiva⁵ database. We use such a keyword as “fintech” and apply the following constraints: (a) dating to 31.12.2015 (without any lower time boundary), (b) available in the English or the German languages, (c) correspond to the selected sources.

Data analysis

The above procedure yields overall 829 articles. A subset of approx. 6% of articles is randomly chosen to provide the first gist on the possible directions of qualitative coding we apply to the whole set of articles. We argue, that this step was necessary to establish a common understanding regarding the nature and characteristics of our data among the involved researchers. It also enabled to establish seed coding schema and the overall coding routine. In order to identify and characterize discourses related to FinTech, a single researcher, under supervision of two other researchers, employs inductive coding. A special attention is given to the content as well as to variations of attitudes towards FinTech. Of specific interest are passages including definition or interpretation of the term FinTech. The number of times an argument or a term appears in the text does not provide any additional meaning, however, indicate what topics dominate the discourse. The coding scheme used for the whole corpus is illustrated in Figure 7 in *Appendix*.

In order to identify the main players who shaped FinTech during the studied period of time and to develop further understanding of the central dimensions and trends, we employ a technique borrowed from natural language processing – named entities recognition. With the help of the Stanford Named Entity Recognizer (NER) using predefined models for English (Finkel et al. 2005) we extract entities falling into one of the following classes: PERSON, LOCATION, and ORGANIZATION. The results undergo manual

⁴ <http://www.4imn.com/about/index.htm#ranking>

⁵ <https://global.factiva.com/>

consistency check and cleaning across the data set: (1) occurrence data for different entity names that refer clearly to one entity are merged (e.g., Google Corp. and Google), (2) all locations are clustered according to the regions, (3) named entities occurring in less than four articles are ignored in further analysis. These changes shall guarantee for easier identification of dominating trends.

Results

In the focus: Definition

In this subsection we would like to address the first part of the research question of this paper, namely “*How is FinTech perceived?*”. In doing so, we provide an integrative perception out of the available definitions of “FinTech” presented in the media, industrial reports and scientific publications. Therefore, special focus of the study was set onto definitions in the corpus of data and in the coding scheme. In this subsection, firstly, we present the list of gathered definitions of “FinTech” and afterwards, taking into account the features and concepts behind them, we propose an inclusive conceptual framework of the FinTech being reflected by the studied sources.

We collected 38 definitions which came from 29 different sources (presented in Table 1). These sources are categorized according to their origin and include three main categories: scientific literature (4 entries, sources marked with one star (*)), industrial reports (8 entries, sources marked with two stars (**)), popular press (26 entries, sources are not marked in any way). The definitions are sorted by date (month and year are considered). We did not limit the lower time boundary; it means that it is set naturally by the first-time appearance of the definition. Thus, the earliest definition appeared in the studied sources in July 2012, the latest presented in the Table 1 is of December 2015. The definitions are distributed throughout the years in the following way: 1 definition in 2012, 5 definitions in 2014, 32 definitions in 2015. The definitions gathered include both those in English (29 entries) and in German (9 entries, were translated into English). The listed sources originate from 10 different countries: *UK* (15 entries), *Germany* (8 entries), *USA* (4 entries), *Ireland* (2 entries), *Switzerland* (2 entries), *Canada* (2 entries), *Korea* (2 entries), *China* (1 entry), *Singapore* (1 entry) and *Netherlands* (1 entry).

The definitions presented in the Table 1 were examined for two dimensions: actual meaning of FinTech, and the function it has. Each of the entries in the table got at least 1 characteristic in the category of meaning, at most 7 characteristics. The criterion to determine the category of “meaning” was the question “What is FinTech?”. This category required direct answer on this question with a noun. In the category of functions, we were not able to assign any function for 3 definitions because it was missing, other 35 definitions got at least one function, at most 5 functions. The criterion to determine the category of “function” was the question “What does FinTech do?”. This category required direct answer on this question with a verb or a combination of a verb and other words. Table 2 and Table 3 present 18 meanings of FinTech and its 13 functions subsequently which further help us to build the integral understanding of FinTech from the perspective of the studied sources. Both tables are sorted from the largest to the smallest value of N, where N stands for the number of times a meaning/function has been used to characterize FinTech in the list of definitions.

Nº	Date	Source	Definition
1	Jul-12	The Independent	This is a new and emerging branch of Britain's financial services industry, the "FinTech" sector as it's known to insiders. It's where young graduates have eschewed their pin-striped destiny in the Square Mile in favour of the alternative working lifestyle of the internet start-up - but are building dynamic companies based on their specialist knowledge of business.
2	Aug-14	The Telegraph	It is excellent news that George Osborne and Vince Cable both recognise that fintech – the area where technology and finance intersect – ought to be an industry in which Britain excels.
3	Aug-14	Accenture**	The Fintech sector is often characterised as a battle between the old and the new.
4	Aug-14	Accenture**	Fintech companies are defined as those that offer technologies for banking and corporate finance, capital markets, financial data analytics, payments and personal financial management.
5	Aug-14	Ernst & Young**	Technology applied to financial services (Fintech) has a significant impact on our daily lives, from facilitating payments for goods and services to providing the infrastructure essential to the operation of the world's financial institutions.
6	Sep-14	Deutsche Bank**	“Fintech” is the term that has now become established to describe the digitisation of the financial sector. Fintech is a catchall used for advanced, mostly internet-based

No	Date	Source	Definition
			technologies in the financial sector. The term describes modern technologies for enabling or providing financial services, such as internet-based technologies in the e-commerce field, mobile payments or early-stage crowd-based financing of startups (crowdfunding, crowd- investing).
7	Feb-15	The Guardian	Simply put, it's "the application of technology in financial services to create disruptive business models and inclusive products," says EY's Imran Gulamhuseinwala.
8	Mar-15	The Banker	Just what is fintech? One regulator says: "Fintech is the R&D function of financial services in the digital age... less to do with technology, more to do with business model reinvention and customer- centric design."
9	Apr-15	Mergers Alliance**	FinTech is a term that has been adapted to herald the digitalisation of the financial services sector, and the emergence of innovative and disruptive banking technologies in particular (which is the focus of this Mergers Alliance report).
10	May-15	The Economist	The magical combination of geeks in T-shirts and venture capital that has disrupted other industries has put financial services in its sights. From payments to wealth management, from peer-to-peer lending to crowdfunding, a new generation of startups is taking aim at the heart of the industry—and a pot of revenues that Goldman Sachs estimates is worth \$4.7 trillion. Like other disrupters from Silicon Valley, "fintech" firms are growing fast.
11	May-15	The Boston Globe	Kensho is one of a growing number of Boston-area companies seizing a moment when the needs of the financial industry and capabilities of technology are coming together, aiming to take advantage of modern computing speeds, troves of data, and the ubiquity of mobile devices.
12	May-15	Die Zeit	...capitulate in the first league of Start-ups, which specialize themselves on financial services – called "Fintechs"...
13	Jun-15	The Economist	A slew of startups in the "fintech" space—short for "financial technology"—now reckon they can do better. Bright young things based in San Francisco, New York, London and Stockholm are raising billions of dollars in venture capital to "disrupt" financial services.
14	Jun-15	KPMG**	In its broadest usage, FinTech refers to the application of IT within financial services, above all, the rise of the internet as a means of lowering barriers both to entry and costs within the industry.
15	Jul-15	Forbes	A new breed of alternative lenders, such as Lending Club, On Deck, Biz2Credit, Kabbage and recently, Goldman Sachs, have emerged to address the gap between small business needs for financing and the willingness and capacity of banks to serve these needs effectively. Collectively known as "FinTech firms," they are pioneering a distinctive online and digital-based approach that promises to greatly enhance small businesses access and efficiency to funding for growth. The new FinTech disrupters are benefiting from the fact that small businesses are increasingly turning online to search for financing, especially through mobile devices.
16	Jul-15	The Times	Financial technology companies (known collectively as FinTech) are broadening access to a range of services that they claim can help us manage our spending, save more money, and make investments in our long-term financial security. FinTech offers users an array of financial services—from transactions to underwriting—that were once almost exclusively the business of banks.
17	Jul-15	Süddeutsche Zeitung	...a lot of Fintechs. Armada of Start-ups call themselves like this. They entered the business of financial services 2-3 years ago and want to compete with traditional banks.
18	Jul-15	Der Spiegel	FinTech is branch offices of the future – an artificial word derived from "Finance" and "Technology". A new market for financial services, a boogaboo for traditional banks.
19	Jul-15	Shim and Shin (2015)*	Fintech is a portmanteau that combines the words "financial" and "technology."
20	Aug-15	The Globe and Mail	A new era of financial technology – "fintech" – is targeting these traditional business models and the banks, investment companies, and insurance distribution networks upon which they are built.
21	Aug-15	Bloomberg Business Week	That's a concern for Frankfurt's future competitiveness as a banking center because the financial technology sector -- often referred to as fintech -- is one of the growth areas in an otherwise shrinking industry.
22	Aug-15	Tagesanzeiger	Fintech is not only a threat to traditional banking business – it is also a chance. And indeed, not only in business with end customers.
23	Aug-15	The Independent	The sector spans everything from money transfer and payments businesses to alternative finance and from Bitcoin pioneers to innovators in big data and analytics.
24	Aug-15	Lee and Kim (2015)*	Fintech is conceptually defined as a new type of financial service based on IT companies' broad types of users, which is combined with IT technology and other financial services like remittance, payment, asset management and so on. Fintech includes all the technical processes from upgrading financial software to programming a new type of financial software which can affect a whole process of finance service. Therefore fintech can improve the performance of financial services and spread the finance service combined with mobile environment
25	Sep-15	Lee and Teo (2015)*	FinTech refers to innovative financial services or products delivered via technology.
26	Sep-15	LONDON Business School Review**	The founder of the UK-based investment crowdfunding platform CrowdBnk says fintech is about "changing processes, changing services, changing costs in a positive manner."

No	Date	Source	Definition
27	Oct-15	Arner et al. (2015)*	“Financial technology” or “FinTech” refers to the use of technology to deliver financial solutions. The term’s origin can be traced to the early 1990s and referred to the “Financial Services Technology Consortium”, a project initiated by Citigroup in order to facilitate technological cooperation efforts. The term now refers to a large and rapidly growing industry representing between US\$12 billion ³ and US\$197 billion ⁴ in investment as of 2014, depending on whether one considers start-ups (FinTech 3.0) or traditional financial institutions (FinTech 2.0).
28	Oct-15	The Bank of New York Mellon Corporation**	The wind of change in the payments world is gaining in strength as financial technology’s (“fintech”) potential to alter how, where and when payments are made – as well as who it is that facilitates them – is further explored and leveraged.
29	Nov-15	Neue Zürcher Zeitung	...If Fintech, the digitalisation of financial services, becomes next "big thing"...
30	Nov-15	The Daily Telegraph	Fintech - technology that permits new ways of paying for things, money transfers, loans, fundraising and so on - is booming in the UK.
31	Nov-15	Handelsblatt	Fintech stands for Financial Technology and means innovative application of modern technologies in the sector of financial services.
32	Nov-15	Süddeutsche Zeitung	Digital Bank-Start-ups - called Fintechs...
33	Dec-15	The Globe and Mail	Mr. Dodig acknowledged that CIBC is facing challenges from new financial technologies, known as fintechs, that are threatening banks' traditional business model. These include virtual currencies, such as bitcoin, and new mobile payment options, such as Apple Pay.
34	Dec-15	Neue Zürcher Zeitung	In the sector "Fintech", new digital business models in financial sector, it comes to cooperation in Switzerland.
35	Dec-15	Süddeutsche Zeitung	...young distinguished financial startups, so-called Fintechs...
36	Dec-15	The Financial Times	Meanwhile, fintech – the hope that technology will nurture new ways of doing finance – is a phenomenon of the moment.
37	Dec-15	The Times	Fintech Vogueish term applied to pretty much anything involving finance and technology.
38	Dec-15	The Guardian	London, meanwhile, is currently beating both Wall Street and Silicon Valley in pioneering fintech, a blend of financial services and digital technology that aims to revolutionise high-street banking for customers and strip out costs for banks.

Table 1. Set of FinTech definitions

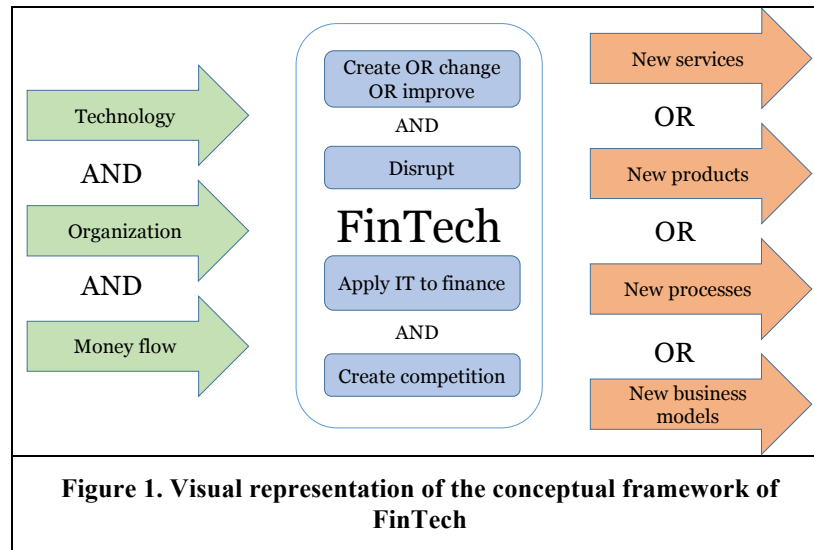
Meaning	N	Sources
Application of IT in finance	10	1, 2, 3, 7, 8, 14, 28, 31, 37, 38
Startups	7	10, 12, 13, 17, 27, 32, 35
Services	6	8, 23, 24, 25, 26, 27
Technologies	5	4, 6, 9, 30, 33
Companies	4	11, 15, 16, 17
Digitalization	4	6, 8, 9, 29
Industry	3	8, 21, 27
Processes	3	8, 24, 26
Market	2	8, 18
Business models	2	8, 34
New generation	2	10, 20
Battle between old and new	1	3
Chance	1	22
Change of processes, services, costs	1	26
Phenomenon	1	36
Products	1	25
Threat	1	22

Table 2. Meaning of FinTech

Function	N	Sources
Combine IT and finance	11	1, 2, 6, 8, 11, 19, 24, 25, 27, 31, 37
Disrupt	8	7, 8, 9, 11, 13, 15, 33, 38
Create / change services	7	4, 5, 8, 12, 15, 23, 30, 36
Create competition	5	3, 8, 17, 18, 22
Reduce costs	3	14, 26, 38
Create new business models	3	7, 8, 20
Innovate	2	9, 25
Digitalize	2	9, 15
Change processes	2	26, 28
Provide customer-centric approach	1	8
Spread financial services	1	24
Give access to services	1	16

Table 3. Functions of FinTech

Conceptual framework of FinTech



In this subsection we derive an integral conceptual framework of FinTech which is based on the analysis of two aspects derived from the list of definitions (Table 1). This conceptual framework of FinTech encompasses the features proposed by the authors and reflects the perception of FinTech in the popular media, industrial reports and scientific articles between the years 2012 and 2015. Figure 1 illustrates the proposed framework.

As can be seen in Figure 1, FinTech has three dimensions: an input (namely the combination of technology, organization and money flow), mechanisms (create or improve or change, disrupt, apply technology to finance, create competition on the market) and an output (creation of new services or products or processes or business models).

Let us look closer at what is meant by each of the aspects included into identified dimensions. By saying “technologies”, the definitions agree on the technologies which underlie financial services such as mobile payments, data analytics, crowd-based platforms or cryptocurrencies. Referring to the “organizations” the sources mean startups and companies, which focus their activities on providing IT-supported financial services or platforms. “Money flow” equals the investments, poured to support the development of such businesses. The dimension of mechanisms includes creation, change or improvement of existing service/product/process or business model in order to increase its quality for the customer (to make it transparent, accessible, to reduce costs or fees, etc.). These activities are supported by the use of technological advancements; this is reflected by the aspect of “application of IT to finance”. The disruptive function of FinTech is explained as the creation of alternatives to the existing banking services by, for example, replacing bank as an intermediary. And finally, by doing so, FinTech creates competition not only among the startups working on the service, but also involves banks into the game and makes them compete. The third, output dimension includes new services/products/processes/business models, which emerge as the result of the transformation.

In order to clarify how these dimensions can look in practice, we refer to the example from KPMG (2015a), namely the company “Wealthfront”. “Wealthfront is an automated investment service which combines world-class financial expertise and leading edge technology to provide sophisticated investment management at prices that are affordable for everyone” (KPMG 2015a). “Wealthfront” (*organization*) introduces the robo-advisor (*technology*) for wealth management. The company has got total funding of \$65.5 million (*money flow*). It *improves* the service of wealth management (*new service*) by providing an automated wealth management platform (*application of IT to financial area*). “Wealthfront” is a *disruptor* in a way that it cuts a middleman by allowing investors to manage their portfolio on the platform but also cuts fees. The number of robo-advisors in wealth management services has significantly grown in the past few years (Deloitte 2015), which brings the raising *competition* into the field both among startups and companies which create them, but also among banks who are threatened to be disrupted.

In the focus: who, where and what

In this subsection we aim to address the second part of the research question and answer, what the primary actors, stimulating the phenomenon over time, are.

In overall, 487 articles in the English language were processed by NER. The articles date from October 1986 to December 2015. This procedure resulted in 31 persons, 88 locations and 119 organizations mentioned throughout the articles which appeared more than 4 times. Afterwards, these entities were subdivided into subclasses, as shown in Tables 4 – 6. The class ORGANIZATION was subdivided into 12 subclasses, the class PERSON into 3 subclasses. Table 7 shows the number of entities of the class LOCATION in relation to the geographical region they belong to. The number in the Tables 4 – 6 shows how many entities belong to each of the subclasses. For example, subclass “*Financial institution*” bears 50 different organizations. Each entity was classified as an individual of one class only.

Organization	Financial institution	50
	IT Company	29
	Startup	18
	Accelerator	5
	Consulting company	5
	Governmental organization	3
	Educational institution	2
	Membership organization	2
	Retailer	1
	Regulator	1
	Telecommunication company	1
	Property company	1

Table 4. Subclasses of the class “ORGANIZATION”

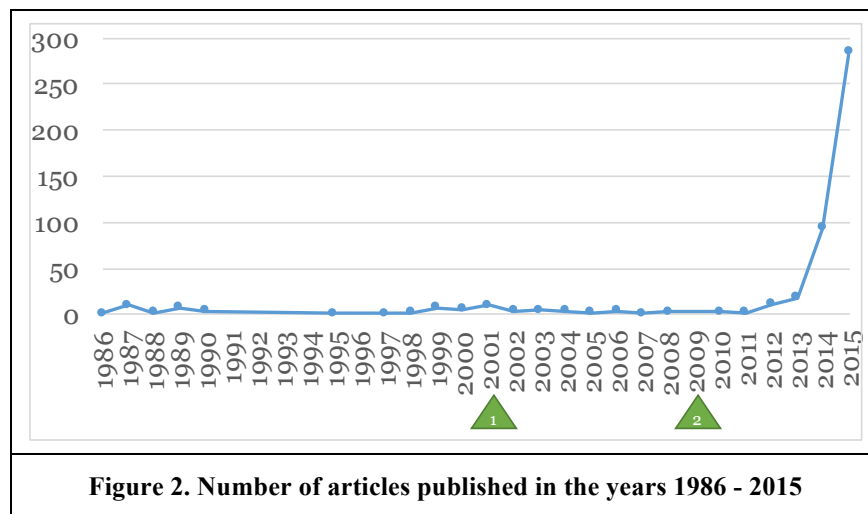
Person	Head of a company	17
	Investor	7
	Politician	6

Table 5. Subclasses of the class “PERSON”

Region	Europe	39
	North America	24
	South America	9
	Asia	7
	Middle East	4
	Africa	3
	Australia	2

Table 6. Mentioned locations classified by the region

As shown in Figure 2, the number of the published articles per year during the studied period is inconsistent. It hardly changed between years 1986 and 2001 (with peaks in 1987 and 2001 – 10 publications per year each), but notably increased between years 2010 (3 publications per year) and 2015 (285 publications per year). Taking into consideration last the most considerable and recent crises happened in the history of the world economy and their strong influence on the market, we roughly divide the time between 1986 and 2015 into three periods – from 1986 to 2001, from 2002 to 2009, from 2010 to 2015. The first marker (1) is set to the year 2001 as the end of the bursting of the dot-com bubble. The second marker (2) is set to the year 2009 which roughly can be considered as the end of the global financial crisis. It is also necessary to mention that there were no articles published from 1991 to 1994, in 1996 and 2009, as can be seen in Figure 2.



Figures 3 – 5 illustrate the percentage of mentioned subclasses of entities. Due to the insignificant number of the articles (varying from 0 to 10 articles per year) during the years from 1986 to 2001 and from 2002 to 2009 the data was aggregated for these periods, whereas the data for the years between 2010 and 2015 presented for each year. Gaps on the graphs mean that there were no articles published or no entity of the subclass was mentioned. 3 periods, which are further discussed, are marked with green markers in Figures 2 – 5. Further in this section we describe general trends and present top “players” who are visible in the media sources for each of the periods.

Period from 1986 to 2001

Organizations

Within this period IT companies strongly prevail: at the beginning (1987 – 1989) and at the end of the period (2000 – 2001); however, financial institutions (1990, 1998) and retailers are present (1988, 1999, 2001) as well, this can be observed in Figure 3. Fintech Ltd. And Xerox are active players at the beginning of the period (1987 – 1989), whereas in the middle of the period (1990, 1998) Bank of America, Morgan Stanley and Federal Reserve (Fed), Fidelity Investments are highlighted by the press. The end of the period (1999 – 2001) brings companies Xerox, Coca-Cola and Amazon to the front.

Persons

This period is almost not covered by the articles mentioning various persons (Figure 4). According to the data, the only person mentioned is David Martinez, who is a head of a company FinTech Advisory which will appear in the the next period as one of the top mentioned organizations.

Locations

Europe and North America are constantly present throughout the period, with peaks in 1986 for Europe and in 1997 for North America when these regions were solely dominating (Figure 5). During this period Europe is mainly represented by the UK, while North America is mostly represented by the U.S. and Canada. Between the years 1987 and 1989 Africa was in the focus of the media, this is represented by South Africa.

Period from 2002 to 2009

Organizations

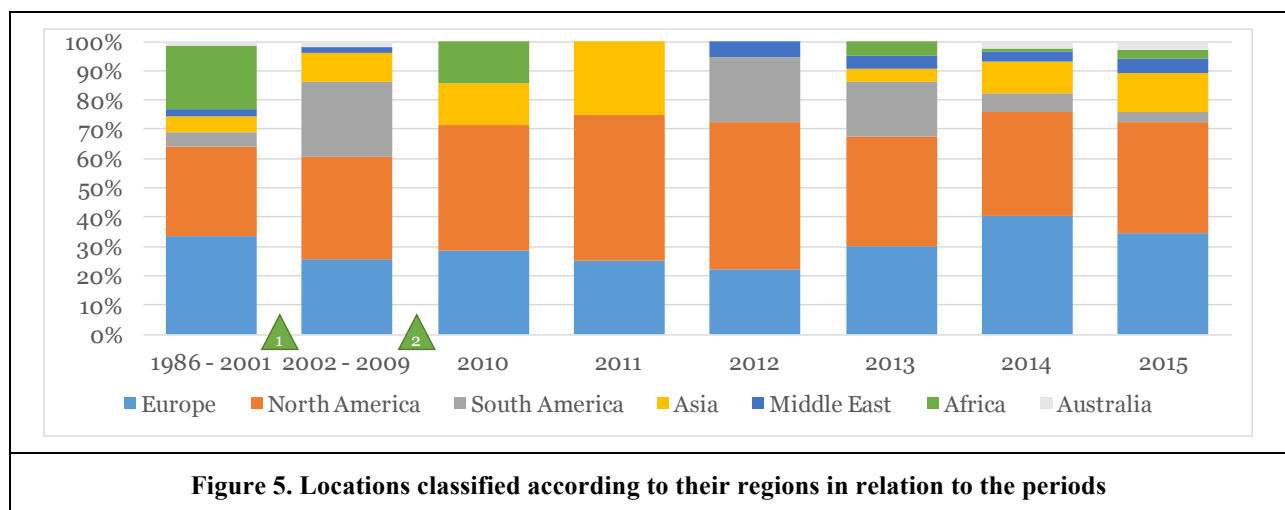
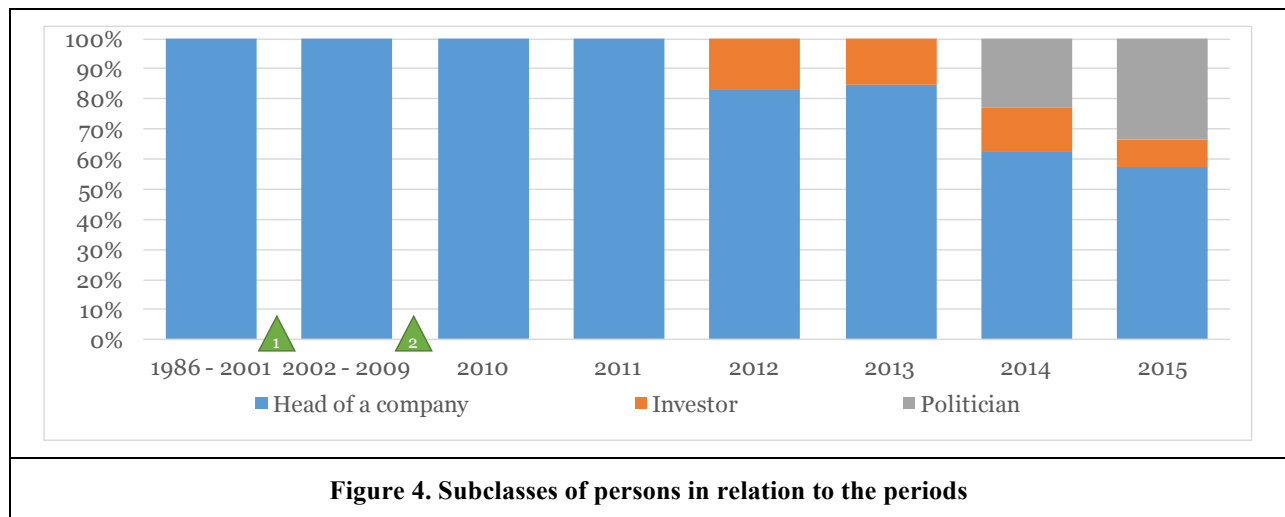
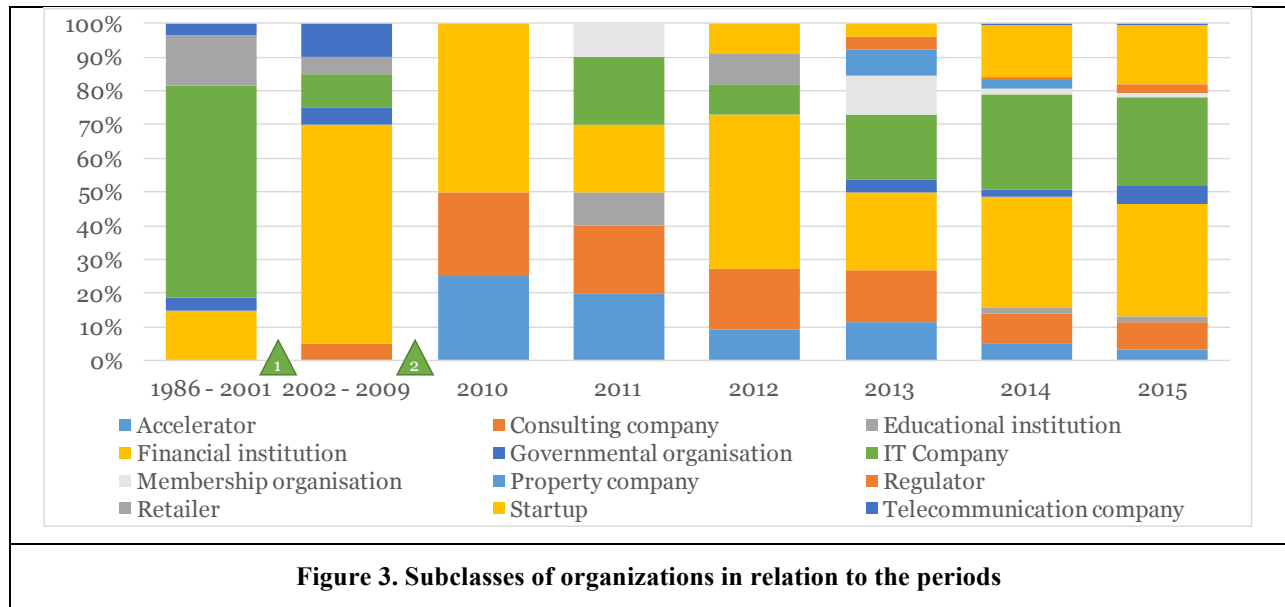
The most considerable type of organizations visible during this period is a financial institution: it peaked in 2004 – 2005 and then in 2007 – 2008 (Figure 3). The top mentioned entities of this period do not show any predominance individually, however, 5 of 10 entities are banks (Bank of America, UBS, Citigroup, Lehman Brothers, BNP Paribas), this indicates strong presence of the banking industry in this period.

Persons

In this period publications of 3 years (2003, 2004 and 2006) out of 7 years mention the persons, these persons purely belong to the class of “Head of a company” (Figure 4). They are represented by 2 persons who are David Martinez and Donald Trump. It is worth mentioning that Donald Trump is considered to belong to the subclass “Head of a company” because of his activities by the moment of the publications and in general the period. In our classification we could attach one entity to only one subclass, and, therefore, should omit some additional roles of the person.

Locations

Having in mind Europe and North America been still strongly present in the corpus as leading markets, we can observe South America (represented by the entities Latin America, Monterrey and Mexico) coming into focus between the years 2003 and 2007. Moreover, Asia (represented by the entity Japan) is a subject of an increasing interest, covered by the press in 2004 (9%), 2007 (20%) and 2008 (60%) (Figure 5).



Period from 2010 to 2015

Organizations

In this period, we can observe the constantly increasing number of the “players” – organizations involved – from 3 different subclasses (Accelerator, Consulting company, Financial institution) in 2010 to 12 (all of the subclasses) in 2015 (Figure 3). From 2010 to 2015 we can notice decrease in the percentage of accelerators and consulting companies mentioned, stability – of financial institutions, increase – of startups and IT companies. The most highlighted organizations within the period include 4 IT companies (Google, Apple, PayPal, Amazon), 4 financial institutions (Goldman Sachs, JPMorgan Chase, Morgan Stanley, Barclays), 1 consulting company (Accenture) and 1 startup (TransferWise).

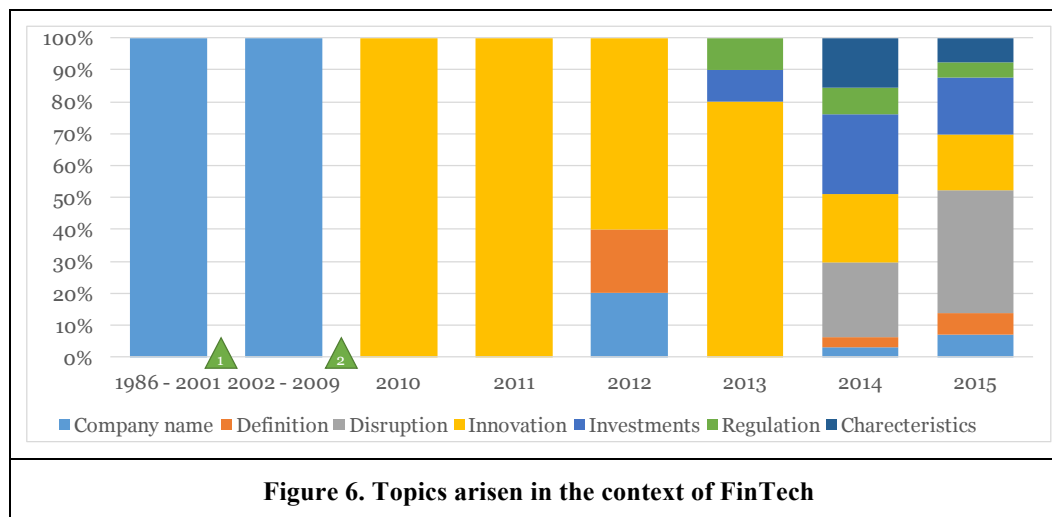
Persons

In Figure 4 we can observe the shift from the press discourse about top management level (represented by the subclass Head of a company) in 2010 to the more diverse, where investors and politicians become more involved and interested in the activities around FinTech, in 2012 – 2015.

Locations

Referring to locations we admit that also more regions become involved in the “game”. Although North America and Europe remain constantly prevailing, Asia (2010 – 2011, 2013 – 2015) and South America (2012 – 2015) are visible in the publications (Figure 5). Considering top locations mentioned in the articles, we can notice that most of them belong either to North America (with special focus on Silicon Valley and New York) or to Europe (focusing on London and UK).

In the focus: what do they talk about?



The third building block of our results is aimed at answering the third part of the research question and presents our findings on the topics which emerged from the articles on FinTech, which constitute our body of knowledge. We can observe that starting from 2010 (before 2010 the articles referred to FinTech mentioning *companies' names*) the topic of *innovations* becomes present, whether it be general discussion, creation of innovation labs, incubators and accelerators or call for innovations. However, along the time the weight of this topic decreases. In 2012 the media starts giving actual non-scientific *definition* of FinTech, these definitions are included in the Table 1 as well. From the year 2013 there is a variety of the topics being discussed: the number of the topics is growing from 3 topics in 2013 to 6 of them by the end of 2015. As mentioned before, in the past two years FinTech industry has attracted the massive amount of investments which almost tripled during two years, from USD 4.05 billion in 2013 to USD 12.2 billion in 2014 (Skan et al. 2015). These figures are supported by our next finding: the topic of *investments* is taking more and more weight during the time from 2013 to 2015. However, we must admit that the topic of investments refers not only to the money flowing in and can be also seen from different perspective – as

the novel technologies for investment management solutions, e.g. “automated financial planning and portfolio management tools and services”. From the year 2014 the topic of *disruption* gains its force, being the most discussed in the year 2015. Here, the articles critically look at FinTech as a “great disruptor” of the banking, and, moreover, discuss its disruptive character and the way it will affect traditional ways of dealing with money. The future opportunities of FinTech interacting with banks are discussed, namely survival of traditional players, cooperation between them and FinTech and its extent, winners and losers of the “game”. This topic goes along with the topic of *regulations* faced by FinTech, which appears in the press in 2013. These articles discuss the role of regulators in relation to FinTech start-ups and technologies, chances to adapt to them and act, if financial regulatory framework becomes too strict for them and the general influence of regulatory changes on the FinTech ecosystem.

Apart from contextualizing FinTech in the areas given above, some articles provide a general, objective account and discuss the topic in its breadth. *Characterizing* features of FinTech (such as speed of intervention, opportunities it brings, fears it causes) is a matter of importance. Therefore, we could observe that many of the articles aim to describe what FinTech could mean dealing with the same topic from different perspectives.

Discussion

In our study we address the following question: *How is FinTech perceived through the lens of the media and how has the perception of the phenomenon developed over time?* However, to approach it and to give better understanding of the topic, we go beyond the understanding of the phenomenon by the press and also consider the drivers of FinTech, which shape the phenomenon, and, moreover, we look at the themes which have been discussed by the media in the context of FinTech. Therefore, we subdivide the research question into three parts, namely: (1) *How is FinTech perceived?* (2) *What are the primary actors that influence FinTech over time?* (3) *What topics are discussed in the press in the context of FinTech?* In this section we reflect on the findings of the study and explain the causality and interrelations between the examined phenomenon and its reflection in the popular press accordingly.

Several studies from different areas of research confirm the fact that the popular press tends to hype a phenomenon, which evolves in the research (Bubela and Caulfield 2004; Caulfield 2004; Mazza and Alvarez 2000; Ransohoff and Ransohoff 2001). These studies show that the connection between the information presented by the media and the research exists. However, the researchers confirm that the media follows different approach in reflecting the information and the facts in comparison to scientific studies (Mazza and Alvarez 2000), whether it be technological advances, managerial techniques or medical findings. In our study we collected definitions (Table 1), which came from the press in most of the cases, and we can observe a large discrepancy between them in terms and key concepts, it indicates the lack of agreement on one notion between different media sources. In contrast to the articles from the press, researchers thrive to reach general consensus towards main concepts and theoretical notions in order to establish consistent body of scientific knowledge and further build upon that. This is generally not expected from the popular press, which can be biased to some extent and, therefore, can provide information with a lower level of accuracy in comparison to the factual reality or highlight facts in a different way. Our study shows that FinTech in its current state is rather keeping to the other way: being hyped by the press, but hardly present in IS research. Thus, following Mazza and Alvarez (2000), we can confirm the influence of the popular press on the directions took up by scholars, namely the growing interest and starting diffusion of FinTech among the researchers. FinTech is at the moment rather a living body and has very flexible and changing nature than a stable notion, which is transparent and clearly understood by both worlds – research and media. In order to overcome this ambiguity, we establish the common understanding of FinTech which gives impulse and clears the way for further research in this area.

We have derived the conceptual framework of FinTech, which represents the current perception of the popular media and strongly resembles the marriage of financial and digital innovations but cannot be completely covered by any of them separately. The definitions of both types of innovations provided in the *Related work* are well-established, recognized by the research community and were chosen according to their relevance to the topic and the high frequency of being cited. The conceptual similarity between FinTech and these definitions can be observed in relation to the consequences of the innovation, such as improved or created product/service/instrument or cost reduction, which are primarily the integral parts

of the definition provided by Frame and White (2014). In the proposed framework of FinTech and conceptual representation of it (Figure 1), it is reflected by the combination of the central “functional” part, which illustrates the necessary mechanisms of FinTech (e.g. reduce costs, apply IT to finance), and the right “output” part of FinTech, which shows the actual outcomes, created by FinTech (e.g. new products, services). However, we should admit that the following difference exists. In comparison to the proposed definitions of financial and digital innovations, to enable the transformation – to “turn on” the machine – FinTech has initial triggers, or antecedents, in form of technologies, companies (startups or financial institutions) and investments. We argue that this can be caused by the nature of evolvement of the phenomenon: as far as FinTech arose and was hyped by the media from its beginning, the question where it factually comes from is also in the limelight. Surprisingly, reflecting back on the gathered definitions, we could not derive an influence of regulatory mechanisms mentioned, however, this influence is steadily visible in the topics being discussed around FinTech in the last three years (2013 – 2015).

Following studies by Frame and White (2004) and Tufano (2003), we observe the changes in FinTech being driven by certain factors. In our data we see each of the proposed impulses which trigger innovations. Reflecting back on four dimensions examined in their dynamics, namely organizations, people, geographical locations and discussed topics, we would like to discuss whether they influence and motivate the emergence and expansion of FinTech and how they fit into the theoretical knowledge on the drivers of financial innovations.

As shown in the results on topic distribution (Figure 6), regulations regarding FinTech attract an increasing attention. Changes in *regulations* is one of the emergent topics discussed in the articles in the last three years. Growing interest for the topic shows the importance of clear legal framework for financial activities, which FinTech operates on. The changes of such regulation may both influence positively, encouraging innovation, or negatively, challenging market players, on FinTech. However, we argue that, on the other side, there is an existing influence on regulation and legislation from the side of FinTech, which makes them adapt themselves to the current conditions of competitive global market and poses challenges in comparison to traditional banking. This explains the regulatory institutions and politicians entering the arena of FinTech, what can be seen in Figures 3 and 4 accordingly. After the global financial crisis of the years 2007 – 2008, the level of trust and interest to financial institutions dramatically goes down and spans different parties and markets, what is naturally supported by the attention of regulators, who provide legal ecosystem.

Although in our study we do not discuss specific underlying technologies, we can confirm the influence of *technologies* on the evolvement of FinTech in the steady activity of IT companies within the period before dot-com bubble and IT start-ups explosion starting after the global financial crisis, observed in Figure 3, the core business of such organizations crucially requires technologies (e.g. well-known IT giant Google or British start-up TransferWise, operating in the area of digital payments). This is also supported by derived definitions which state the clear link between technologies and FinTech, this is also illustrated in Figure 1.

Agency issues and information asymmetries has also stimulating influence on FinTech in a way that FinTech participants are acknowledged to be disruptors of classical banking, financial and insurance institutions, which are standing on the way of the customer to the service. However, FinTech still has not gained the significant market share, what may change in the nearest future and this will bring serious challenges in terms of its disruptiveness. This is closely related to the issues of high *transaction, search and marketing costs*, which is, according to the definition derived in this paper, one of the goals targeted by FinTech providers. In the case of FinTech, this issue is rather a challenge to be resolved than an actual driver of innovation.

The strong influence of economic negative events, which create instability and uncertainty in the market, on the development of FinTech during the time can be observed and related to *instable macroeconomic conditions*, being one of the drivers which cause financial innovation. This is illustrated by the dot-com bubble (green marker 1 in Figures 3 – 5), exploding in the late 90s – early 2000s mostly in the US and partly in Europe, which impacted leading players in the field of information technologies. It caused the shift from strong participation of IT companies to financial institutions, the reason for this can lie in the lacking trust in failing companies. These changes are illustrated in Figure 3: see the difference before and after 2001. This also explains the shift from the focus on the US and Europe to new “playing regions” as Asia and South America, which serve as new growing markets, this growth consequently creates yet unfulfilled needs, thereby filling up gaps meant by *market incompleteness*. Even more visible these effects

are after the global financial crisis (green marker 2 in Figures 3 – 5), when more players – both organizations and regions – become more actively involved and arise the variety of different topics in the context of FinTech. Figures 3 and 5 are supporting this argument: consider the number of various branches and world regions appearing in the articles after 2009.

We conclude that all the drivers discussed above do not act exclusively but rather prepare a fruitful soil for activities of FinTech. This combination of regulatory issues, technological advances, information asymmetries between market participants, economic instabilities and market incompleteness on top create ground for stimulated innovation on the crossroads of finance and technologies.

Limitations and conclusion

In this paper we used explorative and descriptive approach to address the term “FinTech”. The results of this paper show that FinTech is emerging in the industry but as the term little mentioned in science. Exploding popularity of FinTech suggests that collection of knowledge is highly required and should not be limited only to technological aspects. Therefore, we did the first step towards the comprehension of the term “FinTech” unveiling its potential and bringing from the practical field to IS research.

The contribution of this work is fourfold. First, this study provides the audience with the conceptual framework of FinTech how it is perceived by the popular media, which may serve as a basis for future studies, and the overview of how this phenomenon evolved and developed within the time. In doing so, we reveal main “building blocks” of FinTech. Moreover, we highlight the importance and novelty of FinTech for IS research, thus, this paper serves as a call and inspiration for researchers. Second, this paper provides a methodological approach for analysis of the phenomenon, that is hardly presented in the IS research but hyped by the social entities (in scope of this study it is the popular media). Third, the paper contributes to the financial innovation and digital innovation literature by extending the available knowledge on the drivers of innovation and by putting FinTech into the context of its research. Fourth, this study may also bring practical value to researchers, participants of the financial market and other interested parties, who would like to take a retrospective look at the origins of FinTech or focus their activities in this area.

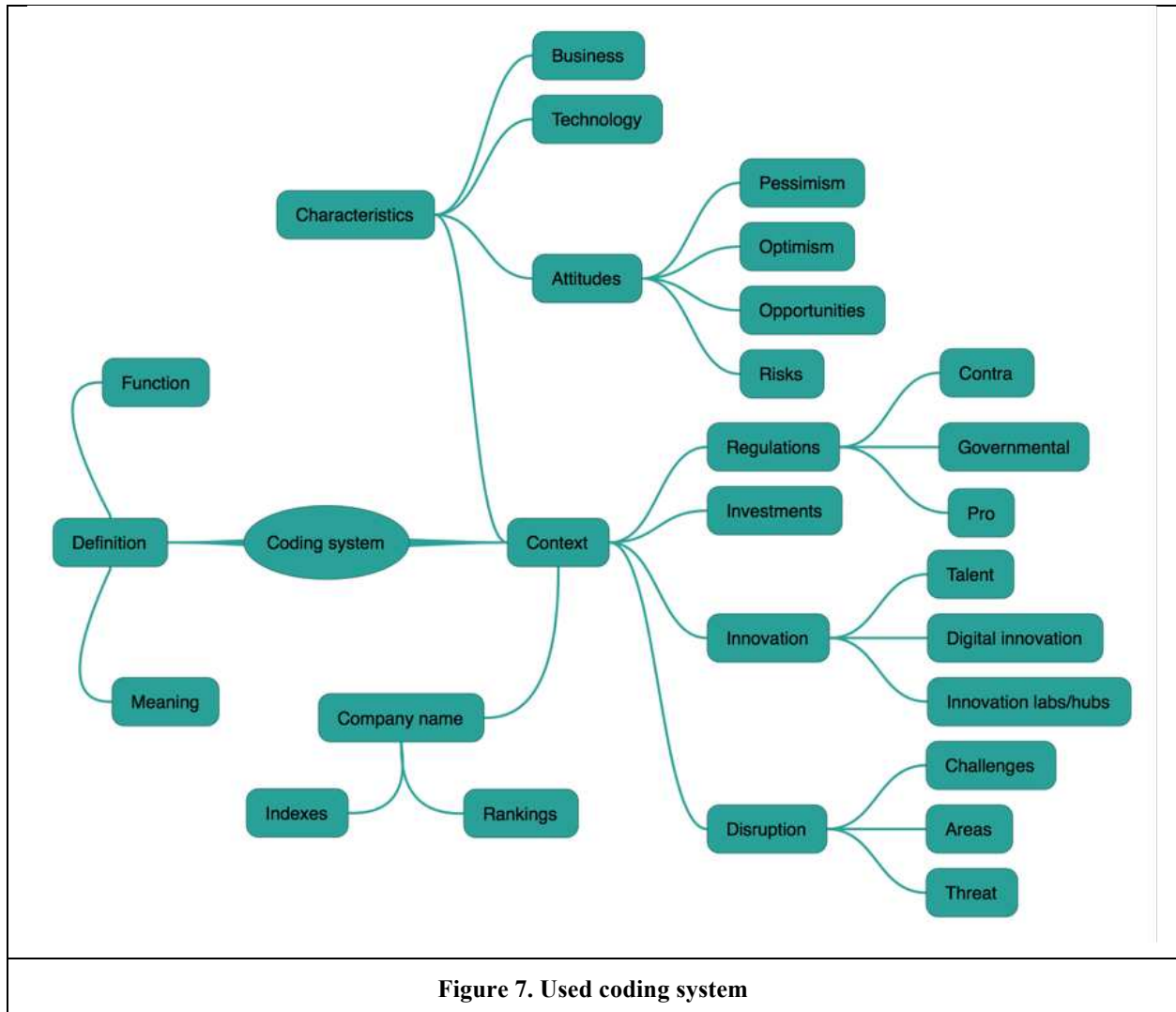
This study has several limitations which are noteworthy to mention and which provide opportunities and new directions for the future research. First, we focused only on the sources of information which geographically refer to European countries, the U.S. and Canada. As far as the researchers who performed this study could review only articles in the German and English languages and, therefore, put them into the focus of the paper, we see it as its second limitation. Here, we should also confirm the application of the technique of named entities recognition only to the articles in English. However, we assume that the Asian part of the world does not lag behind in technology and development and has a large potential in growth of new FinTech hubs. For example, in the report of KPMG (2015b) authors discuss challenges and prospects for Hong Kong area and conclude that it “has all the ingredients necessary to be a global center of FinTech innovation and growth”. It would be valuable to complement our research with the similar one, targeting and exploring Asian countries and to identify the most prominent topics around the area, but also to make comparison with this study and to find differences and similarities in development or tendencies of FinTech. This would help researchers to take even the broader view and understanding of the research landscape of FinTech in the world and on international information systems scene.

Thirdly, we confirm that this study does not aim to evaluate the used media sources from the perspective of the political or social influence which might also make some inconsiderable impact on the discourses observed in the study, though, we doubt that this impact would dramatically change the results. However, we reviewed a large number of the articles, it's essential to understand that most of the newspapers and magazines are of general topics, and therefore, we encourage researchers to observe the current situation of FinTech focusing more on media sources on business, technology, entrepreneurship, finance, etc. to see whether new topics or directions could be identified in professional press.

Having in mind observed topics, opportunities and issues closely related to FinTech, we encourage and see the great potential for the IS community to strongly contribute to this area, both from the perspective of the business science and information technologies. We suggest validating the conceptual framework of FinTech by searching for empirical evidences among FinTech companies, extending it and establishing interrelationships between its elements. However, it is also important to investigate the trends, directions,

strength and weaknesses of the field from the perspective of FinTech practitioners (investors, startups, banks, etc.). Another possible direction to extend this work is to analyze such media sources like blogs, podcasts or even university courses and to look if this perception differs from the introduced framework. Furthermore, we would like to encourage researchers to use the opportunity for the use of Social Network Analysis, which was out of scope of this study, however, has potential to bring fruitful results in terms of primary players, technologies and disruptive areas of FinTech.

Appendix



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